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UNITED STATES PATENT APPLICATION

FOR

**METHOD AND APPARATUS FOR
REGENERATING
MESSAGE DATA**

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BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates in general to the field of electronic mail processing and more particularly to a method and apparatus for regenerating electronic mail.

2. BACKGROUND ART

Electronic mail messaging (email) is the prime means of communication used to provide customer service support by most Internet based businesses. Customers use email to request information from (or deliver information to) the company's customer service representatives (CSR). Email is also used by the company's electronic systems to communicate without human intervention with customers. Companies that use electronic mail (email) to provide customer service usually need to keep a historical log of all the correspondence between the company's online system and the customers. Such correspondences must be stored in a manageable way so as to enable any entity representative (e.g. a customer service representative) to find information in the historical data.

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identifiers. Unique identifiers are, for example, numbers attached to each new email message. By keeping the same number in all subsequent emails, it is possible to track *a posteriori* all related email messages. This method is still prone to inaccuracies; since customers may use same unique numbers for different topics, for example if the customer uses the "reply" functionality, present in many modern email clients, the subject line will include the content of the subject, including any unique identifier.

In addition to shortcomings in parsing email messages, storing a big volume of data is costly in terms of hardware storage media, and in terms of search and processing time. Thus, there is a need for a system that overcomes the limitations of current system by providing for efficient storage and processing of electronic mail data. For example, there is a need for a system that provides a way to regenerate electronic message data without having to store each and every message that is transmitted.

SUMMARY OF THE INVENTION

In one embodiment, the invention comprises a system for regenerating electronic mail. If, for instance, a server program previously sent the user an electronic mail message, that electronic mail message may be regenerated by an embodiment of the invention and retransmitted to the user or provided to support personnel upon request. Thus, the invention provides a mechanism for regenerating previously generated message data. Such message data is typically generated in response to a triggering event. The user initiates the triggering event in one embodiment of the invention, but such an event may also be generated in response to command initiated by any individual having a need to obtain an instance of the previously transmitted message data. For example, any individual associated with the entity that is to transmit the message (e.g., by customer support, technical support, etc...) may initiate a triggering event. The technique utilized to regenerate messages may also be utilized to initially generate messages that are to be transmitted.

Once a triggering event occurs, the system obtains a template associated with the type of triggering event that occurred. Thus, each triggering event may have a type that is related to a particular template. Each template may comprise information related to a particular transaction or activity engaged in by the user (e.g., a customer). Once the template information is obtained, the

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system accesses the user's account record to obtain information specific to that user. This user specific information is combined with the template information to generate a personalized message that responds to the triggering event. Once the message is generated it can be transmitted to the user for display.

Once the system transmits the message generated using the template to the user, the system saves data associated with that message in the historical data file (e.g., a log file, text file, and/or any type of database). In one embodiment of the invention such data comprises a portion of the original message data. The historical data file may contain, for example, data utilized to populate the template with information that applies specifically to the user that received the message data. The template data common among all messages of a certain type may be excluded from the data residing in the historical data file. The historical data file may contain information that provides the reason the message was initially transmitted. Thus, the data file may comprise information that identifies why the message was transmitted and what event the message was transmitted in response to. The data file may also include a template ID that identifies which template to utilize.

In one embodiment of the invention, the system comprises a regeneration module configured to retrieve and restore the historical records of each user's transaction and correspondence upon request. If, for example, a duplicate of

the initial message is requested, another instance of the previously generated message may be created.

If a request for a previously transmitted message is initiated, the system obtains the record of the user whom the message was transmitted to on a prior occasion. The user information is extracted from the user record and the relevant template is identified and populated with information from the user record. The populated template is then utilized to re-create a new instance (e.g., an electronic mail message) of a previously transmitted message. Thus, the system can reformulate any message transmitted to a particular user on a prior occasion. For example, the system may reformulate messages initially transmitted to the user when the user registers, or when an existing customer makes a purchase or requests a credit for a previous purchase. However, in one embodiment of the invention, the system may regenerate any type of message data (e.g., text, sound, video, etc...) previously transmitted to the user. Such message data may comprise data associated with an online or offline transaction and may comprise text, sound, video and/or any other type of digital information.

In accordance with one embodiment of the invention, the new message instance provides representatives of the entity that transmitted the original message with a copy of the message to review. Thus, the entity representatives

may utilize the invention to determine what kind of message data has already been communicated to the user and utilize this message to assist the user. The entity representative may, for example, elect to transmit a new instance of the message data to the user so as to provide the user with another copy of the message.

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BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects and advantages of embodiments of the invention will become better understood with regard to the following description, appended claims and accompanying drawings where:

Figure 1a comprises an example of a current system for processing electronic mail messages.

Figure 1b comprises a flow chart illustrating the process utilized by an embodiment of the invention to generate and then subsequently regenerate message data transmitted to a user;

Figure 2 illustrates the process utilized by an embodiment of the invention to regenerate an instance of a previously transmitted message;

Figure 3 illustrates the interface utilized by an entity representative to locate messages associated with a particular user in accordance with one embodiment of the invention;

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Figure 4 illustrate the search results interface in accordance with one embodiment of the invention;

Figure 5 illustrates a detailed view of the user account information in accordance with one embodiment of the invention;

Figure 6 illustrates a message history interface in accordance with an embodiment of the invention;

Figure 7 comprises an illustration of a message that was previously transmitted to the user and subsequently regenerated by the system in accordance with one embodiment of the invention;

Figures 8 illustrates the process utilized by an embodiment of the invention to generate a new instance of message;

Figure 9 illustrates the data flow for creating and regenerating messages in accordance with one embodiment of the invention;

Figure 10 illustrates a more detailed version of the system flow utilized to generate an electronic mail message in accordance with one embodiment of the invention;

Figure 11 illustrates a general hardware environment configured to execute an embodiment of the invention.

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DETAILED DESCRIPTION OF THE INVENTION

In one embodiment, the invention comprises a system for regenerating electronic mail when a certain event transpires. If, for instance, a server program has previously sent the user an electronic mail message, that electronic mail message may be regenerated by an embodiment of the invention and retransmitted to the user or provided to support personnel upon request.

In the following description, numerous specific details are set forth to provide a more thorough description of the present invention. It will be apparent, however, to one skilled in the art, that the present invention may be practiced without these specific details. In other instances, well known features have not been described in detail so as not to obscure the present invention.

In order to provide adequate service to users, it is helpful for the individuals (or entities) who provide such services to have access to information previously communicated to the users. For example, technical support personnel or any other individual that represents the a particular entity can more expediently help a user solve a particular issue when the individual has access to the history of messages that have already been communicated to the user. Such historical information may comprise customer information, account status information, transaction information, prior correspondence, electronic

mail messages, notes about previous conversations, recordings of prior conversations, and/or any other type of information containing information relevant to the issue the user is inquiring about. This historical information (or any other type of information sent to the user) may be regenerated and provided to the entity representative or the user for information purposes. Regenerating previously stored messages provides the capability to optimally store such historical information. In one embodiment of the invention, the system stores only the applicable information that appeared on the initial email template and not the entire email message. The specific information contained in the body of the email message may be stored in the Name Value Pairs field (See e.g., SentLog table described below for the fields and descriptions that are saved in the message data file.) For example, the Name Value pairs may contain information such as the balance remaining in the user's account, information about a credit card charge, or the amount of a particular purchase (e.g., the purchase of online postage).

An embodiment of the invention provides the capability to immediately store and accurately retrieve historical information. For example, an embodiment of the invention may store final calculations as they initially appeared on the original message. The system is therefore not required to recalculate or reprocess the data when it is requested again. All the data is

calculated the first time the email is created and sent to the customer. The calculated values are stored in the message data file and then retrieved on demand to display in the regenerated message. The data stored in the data file may be stored immediately (or a some time interval) after the system sends the message to the customer, so the values are the current and accurate. The system does not have to recalculate information on historical values so there is less chance of error and the regenerated email information is reliable.

With existing system entity representatives (e.g., Customer Support Representative) have difficulty relocating information previously provided to a customer. It can take an unreasonable amount of time to search through the entire system and find the exact information in question. Problems arise when information is stored in different data files and the system must retrieve, process and display information from different data files. If a system searches through and extracts data from multiple data files, it is much slower than searching for and extracting data from only one data file.

Using the message regeneration feature in accordance with one embodiment of the invention solves these problems. The system implementing an embodiment of the invention may store all the transactional data for the customer and the required template information in the same data file. When the entity representative wants to review an email message, the system goes

only to one data file and quickly extracts and displays the correct data in the correct template and regenerates the requested email.

System Overview:

An embodiment of the invention provides messaging services to an entity that transmits message data (e.g., electronic mail messages) to a plurality of users. Such message data is typically generated in response to a triggering event. The triggering event is initiated in one embodiment of the invention by the user, but such events may also be generated in response to a command initiated by any entity associated with the transmitted message (See e.g., Figure 1b, step 100). A triggering event may comprise any type of event complemented by the transmission of a message subsequent to the event. For example, a triggering event may comprise a technical support request, a customer service request, an account status inquiry, a service inquiry, a general information request, and/or any other type of inquiry.

The triggering event may also comprise a certain task or command initiated by the receiving user and/or the user who operates the system. For example, when a user performs certain tasks using a client program and the user wishes to receive confirmation of that task, a triggering event may be initiated. The system is designed in such a way that triggering events may be

defined as any type of event where information is accepted from the user. For example, if a user purchases goods and/or services the purchase acts as a triggering event for the transmission of a message confirming the transaction.

In one embodiment of the invention, when a triggering event occurs the system obtains a template associated with the triggering event (e.g., at step 102). The system may be provided with access to a variety of templates. Each template comprises information associated with one or more triggering events. For instance, each template may contain information related to a particular transaction or activity engaged in by the user. The system may contain a template that, for example, provides the user with confirmatory information, order information, purchase information, registration information, technical support information, and/or any other information related to an action (or inaction) of the user.

Once the template information is obtained, the system accesses the user's account record to obtain information specific to that user (e.g., at step 104). This user specific information is combined with the template information to generate a personalized message that responds to the triggering event (e.g., at step 106). Any calculations or processor intensive operations may performed at this step. Once the message is generated it can be transmitted to the user (e.g., at step 108).

Simultaneous with transmission of the electronic mail message to the user, the server may store data extracted from or associated with the message in a historical data file. In one embodiment of the invention such data comprises a portion of the original message data. For example, the result of any calculations made while the message was being generated may be stored in the historical data file. In one embodiment of the invention, the historical data file comprises user specific and general data (e.g., template data). The user specific data comprises information unique to the particular message that was sent (e.g., the personalized data). Such data may be associated with a particular user (e.g. user name, account information, electronic mail address, user account balance, and/or any other information associated with the user).

The general data may comprise the template information utilized to initially generate the message. The template information typically comprises general information not specifically related to a particular customer. The template data that is common to all messages of a certain type may be excluded from the data residing in the historical data file. In some instances, the entire contents of the template as well as the information added to the template is stored in the historical data file.

Such information may be utilized by an embodiment of the invention to represent the message previously transmitted to the user. The historical data

file thereby comprises the transaction information contained in previously transmitted messages. The historical data file may also contain other information needed to regenerate the message using minimal processing activity (e.g., calculated data). The specific details stored in the historical data file in accordance with one embodiment of the invention are displayed below in the sentlog table. However, the historical data file may contain other information related to the message that was transmitted.

✓ In one embodiment of the invention, the system comprises a regeneration module configured to retrieve and restore the historical records of each customer's transaction and correspondence upon request. At step 112, an embodiment of the invention determines if another instances of the original message was requested. If a duplicate of the initial message is requested, step 114 executes and a duplicate of the message is created.

Figure 2 illustrates the process utilized by an embodiment of the invention to regenerate or duplicate an instance of a previously transmitted message. The message regeneration process initiates when the user or a representative tasked with helping the user initiates a request for a previously transmitted message. Thus, at step 200, an embodiment of the invention determines if a request for a previously transmitted message was initiated (e.g., does request exist in sentlog). If such a request was initiated, the system obtains

In accordance with one embodiment of the invention, the new message instance provides representatives of the entity that transmitted the original message with a copy of the message to review. Thus, the entity representative can determine what kind of message data has already been communicated to the user and utilize this message to assist the user. The entity representative may, for example, elect to transmit the new instance of the message data to the user so as to provide the user with another copy of the message.

If, the user has any questions or issues regarding the status of an item confirmed via email, the entity representative may utilize an embodiment of the invention to lookup the user's account history data. The account history data comprises a listing by title, subject, or category of the electronic mail messages previously transmitted to the user. If the entity representative wishes to review one or more of the messages on the list the representative may select the message title that causes the system to regenerate the message and display the result to the representative for review (e.g., at step 214).

In one embodiment of the invention, the title of the message (or some other icon or text representative of the message) comprises a link (e.g., a hyperlink or button). When the link is selected, a page comprising a new instance of the message previously sent to the user is displayed. The message may be regenerated utilizing the information contained in the historical data

file. The email regeneration feature of the system provides an accurate, reliable and immediate recreation of the original electronic mail message as it was sent to the user.

The electronic mail message is typically regenerated whenever an authorized user initiates a request for another instance of the message. In one embodiment of the invention, the message is recreated using the same template and data values present in the original message. Thus, the system comprises an archived copy of each template that may be transmitted to users.

The invention also contemplates an embodiment where the system tracks different versions of the template files. Version control management may be performed at a database which modifies the database tables accordingly. For example, the TemplateMap table and TemplateURL tables may be modified to manage version information. The TemplateURL table tracks instances of new templates that have been generated. The TemplateURL table may have a template ID and a template URL which points to an actual template file. When a new version is created a new template ID and an associated TemplateURL is added to the TemplateURL table. The TemplateMap table may comprise two different fields. The first field tracks types of template files (e.g., welcome message, confirmation) the second field tracks the template ID (e.g., template ID 1) associated with that template message type. When a new template is added

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to the TemplateURL table the TemplateMap table is modified to reflect that update.

In one embodiment of the invention, the system utilizes a template to generate and regenerate electronic mail messages, thus the system is not typically required to store the entire contents of each previously transmitted message. Instead, the system store data that is specific to the customer and utilizes the template to obtain other information pertinent to the message that is to be generated. Thus, an embodiment of the invention provides a mechanism for regenerating message data associated with a particular user without necessitating the storage of such information.

Figures 3-7 provide an example of the interfaces displayed to the entity representative in order to regenerate a message previously transmitted to a particular user. The interfaces shown here are for example purposes only. The invention contemplates the use of graphical user interfaces and other types of interfaces (e.g., command line) that contain more or less information than what is illustrated in Figure 3-7.

Figure 3 illustrates the interface utilized by an entity representative (e.g., customer support) to locate messages associated with a particular user. Interface 300 may be embedded in any type of client or server based program (e.g., browser 304). In one embodiment of the invention, interface 300

entity representative may select one of the results or a portion of the result (e.g., the user ID) to obtain further information about that particular record.

Figure 5 illustrates a detailed view of the user account information in accordance with one embodiment of the invention. The account details for the selected user appear in user profile window 500. User information header 502 comprises data that uniquely identifies the user (e.g., the user's last name, first name, middle name, user name, customer ID, and account number). User profile window 500 comprises account status information 504 and contact information 506.

To review email messages, the entity representative may select Message history link 508 at the top of the window. Upon selection of the Message history link a list of the messages (e.g., electronic mail messages) previously transmitted to the selected user appear in a message history window.

Figure 6 illustrates a message history interface in accordance with an embodiment of the invention. Message history interface 600 comprises a list of messages sent to the user (e.g., the customer on a prior occasion). Each entry in the list comprises identifying information 602. The invention contemplates different types of identifying information 602. Each piece of identifying information is typically provided in order to aid the entity representative in locating or identifying the contents of the message. However, identifying

information 602 may be provided for other purposes. In accordance with one embodiment of the invention, identifying information 602 comprises information associated with a previously transmitted message (e.g., an electronic mail). In this instances identifying information comprises a status field, a from field, a to field, a subject field, a date field, and/or any other field that has information useful to the searching user (e.g., the entity representative). The status field indicates whether the message was sent and if so whether confirmation of the transmission of the message was ever received. The status field may, for example, contain text stating the message was "sent (not confirmed)".

The from field indicates the originating party. Thus, the from field may contain the name or electronic mail address associated with the party who initially transmitted the message (e.g., "Customer Support – support@stamps.com or Technical Support – techsupport@stamps.com"). The to field comprises an address associated with the user that received the message. The subject field identifies what the subject of the transmitted message was and the date field indicates the date the message was sent.

When the user (e.g., the entity representative) identifies a particular message that is to be regenerated (e.g., by selecting a portion of the identifying information) the system provides a new instance of the message. Figure 7

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comprises an illustration of a message that was previously transmitted to the user and subsequently regenerated by the system. The message shown in Figure 7 is for example purposes only. It is important to note that an embodiment of the invention may be utilized to generate and then subsequently regenerate any type of message. The message shown in Figure 7 comprises a "welcome" message 700 that was transmitted to the user when the user initially registered for a service provided by the entity associated with transmitting message 700. Certain portions of this "welcome" message 700 are generated using information from one or more template files whereas other portions of the "welcome" message 700 are extracted from one or more user records. In one embodiment of the invention message 700 comprises header portion 702 and body portion 704. Header portion 702 contains the addressing information (e.g., from, to, subject, date) and body portion contains text or some other type of data.

In one embodiment of the invention, the "welcome" message shown in Figure 7 was regenerated using the template utilized to initially create the message and the data values stored in the historical data file at the time the message was initially generated. The original data values for the message shown comprise:

- date and time the email was initially created
- To: name

- From: name
- subject: title of the email message
- customer's name
- initial postage purchase amount
- amount of free postage due this customer

This information is combined with the template data and utilized to generate a second instance of the message for use by the entity representative. The entity representative may utilize the message for informational purposes or elect to transmit the message to the user. If the entity representative wishes to obtain another message (e.g., a different type), the representative may go back to the Message history interface and select another message for display.

System Level Description:

When the entity representative views the Message history list an embodiment of the invention utilizes the process illustrated in Figure 8 to generate a new instance of the selected message. The process begins at step 800 when the entity representative (or some other user) initiates a command to obtain a list of messages associated with a particular user ID. Once the system obtains the command, the system executes step 802 where it queries the historical data file (e.g., the sentlog table in the message data file) and then displays (e.g., at step 804) a list of all email messages that correspond to the selected User ID. In one embodiment of the invention, the command request is

transmitted through a web server and an ASP is utilized to generate the list of messages that are to be displayed. The ASP is configured to display the list of messages that apply only to the selected user.

Once the message list is generated, the entity representative locates the message and chooses a particular message (e.g., by selecting a portion of the message). At step 806, the system determines if the user has selected a message contained in the list. When a message is not selected, the system waits for a selection or exits. If a message identified in the list is selected the system obtains a record that matches the selected message (e.g., at step 808) from the sentlog table. The following table illustrates the contents of the sentlog table (e.g., sentlog 904) in accordance with one embodiment of the invention.

Sentlog Table

Field	Description
Cust ID	customer identification number
TemplateURLID	identification number for the URL that displays a specific version of the template
SentNVPairs	Sent Name Value Pairs – the personalized data for the selected customer that appears in the email template. The data is stored in the table as a string of text, up to 7168 characters long.
Status	status of the customer account
DateSent	date and time the initial email message was sent
DateServerReceipt	date the destination SMTP server received the message (currently not used)
DateReadReceipt	date the destination user opened the message (currently not used)
MsgFrom	sender of the message as appeared in the From:

	field in the email.
MsgTo	recipient of the message as appeared in the To: field in the email.
MsgSubject	subject of the email as appeared in the Subject: field in the email.
MsgID	identification number of the email message.

In one embodiment of the invention the matching record contains information from the sentlog table. A script of computer program (e.g., a PERL script, JAVA program, or any other type of computer readable program code) may be utilized to pick the matching record from the sentlog table. The matching record may contain, for example, the following information:

- Customer ID
- Template URL ID
- Data string from in the template fields
- Status of account
- Date/time when email was originally sent
- Send to: email address
- To: email address
- Email subject;
- Message ID

The system then executes step 810 where it retrieve the data stored in the sentlog and sends it to a template URL. The template URL is mapped to a template ID and name. The following table shows the TemplateURL table (e.g., Template URLs 901) layout in accordance with one embodiment of the invention.

TemplateURL Table

Field	Description
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TemplateURL-ID (902)	Identification number for the URL for a specific template
URL	URL pointing to a template file.

Templates are periodically updated and the system is configured to use the most recently updated version. However, in some instances other template versions are utilized. If, for example, a message was generated using an template that is no longer flagged as active, but that template still contains information relevant to the transaction, the system may utilize an out-of-date template.

Figure 9 illustrates the data flow for creating and regenerating messages in accordance with one embodiment of the invention. MessageRequest Queue 906 comprises a list of message requests initiated by client 921 and sent via server 920. A request may comprises a regenerate message request or a create message request. An illustration of the information contained in TemplateMap 900 follows.

TemplateMap Table

Field	Description
TemplateType	Template identification number

When the data (e.g., customer / user data) is sent to the template, the system generates (or regenerates) the message using the matching data and the template data (e.g., at step 812). In one embodiment of the invention, the text of the message and sends XML data back to the program that located the match (e.g., the Perl code). However, the invention also contemplates the use of separate programs that pass parameters between one another to implement an embodiment of the invention and is not limited solely to XML. For example, the invention may be implemented using any type of programming language capable of storing template and user information. A sample of the XML data that represents the "welcome" message discussed above follows:

```
<?xml version="1.0" ?>
<xmlStampsMessage>
  <xmlMessageFrom>"Stamps.com Customer Support"
    <support@stamps.com></xmlMessageFrom>
  <xmlMessageTo>sdct01_us@yahoo.com</xmlMessageTo>
  <xmlMessageSubject>Welcome to
    Stamps.com!</xmlMessageSubject>
  <xmlMessageDate>Wed, 29 Mar 2000 19:12:02 -
    0000</xmlMessageDate>
  <xmlMessageBody>Dear Jon, Congratulations! Your official U.S. Postal
    Service Postage License has been approved by the U.S. Postal
    Service; you are now ready to start printing postage with
    Stamps.com. Double-click on the Stamps.com icon on your desktop
    and then click on [Print Postage]. You can now print postage from
    your printer 24 hours a day, 7 days a week! Your initial Postage
    Purchase of $10.00 has been added to your postage account. The
    service plan you chose entitles you to $20.00 of FREE postage,
    which has also been added to your account. Your total postage
    account balance is now $30.00. Please do not hesitate to contact the
    Customer Support Team if you have any questions or need any
    further assistance. We are available any time day or night via
    LiveAnswer at www.stamps.com/support/, email at
    support@stamps.com, or toll-free phone at 1-888-434-0055. Your
    user name is sdct1. Thanks again for using the Stamps.com Internet
    Postage service! Sincerely, Stamps.com Customer Support Team
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*** For more information about Stamps.com Internet PostageTM,
visit us at www.stamps.com
*****
*** </xmlMessageBody>
_ <xmlPropertyLog>
  <xmlINVPair>getMessageDate=Wed, 29 Mar 2000 19:12:02 -
    0000</xmlINVPair>
  <xmlINVPair>getCustProp.UserName=sdct1</xmlINVPair>
    <xmlINVPair>getRequestItem.strMeterAmount=$30.00</xmlINVP
    Pair>
  <xmlINVPair>getRequestItem.shopper_id=005a0850-
    000001f4</xmlINVPair>
  <xmlINVPair>getOrderFormProp.bill_now=1000</xmlINVPair>
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    NVPair>
  <xmlINVPair>getCustProp.FirstName=Jon</xmlINVPair>
  <xmlINVPair>getRequestItem.cn=005a0850</xmlINVPair>
    <xmlINVPair>getCustProp.eMailAddress=sd01_us@yahoo.com
    </xmlINVPair>
</xmlPropertyLog>
  <xmlTemplateErrorCode>0</xmlTemplateErrorCode>
</xmlStampsMessage>

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The program that accepts the XML data then reformats the XML to a format that can be readily displayed to the user (e.g., HTML, SGML, Javascript, or any other language that can be utilized to display data). Once the XML is reformatted it may be displayed to the entity representative that selected the message from the list in the first instance.

Figure 10 illustrates a more detailed version of the system flow utilized to generate an electronic mail message in accordance with one embodiment of the invention. The process initiates when the user requests the message (e.g. at

Embodiment of Computer Execution Environment:

An embodiment of the invention can be implemented as computer software in the form of computer readable program code executed on one or more general-purpose computers such as the computer 1100 illustrated in Figure 11. A keyboard 1110 and mouse 1111 are coupled to a bi-directional system bus 1118 (e.g., PCI, ISA or other similar architecture). The keyboard and mouse are for introducing user input to the computer system and communicating that user input to central processing unit (CPU) 1113. Other suitable input devices may be used in addition to, or in place of, the mouse 1111 and keyboard 1110. I/O (input/output) unit 1119 coupled to bi-directional system bus 1118 represents possible output devices such as a printer or an A/V (audio/video) device.

Computer 1100 includes video memory 1114, main memory 1115, mass storage 1112, and communication interface 1120. All these devices are coupled to a bi-directional system bus 1118 along with keyboard 1110, mouse 1111 and CPU 1113. The mass storage 1112 may include both fixed and removable media, such as magnetic, optical or magnetic optical storage systems or any other available mass storage technology. The system bus 1118 provides a means for addressing video memory 1114 or main memory 1115. The system bus 1118 also provides a mechanism for the CPU to transferring data between

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program code, through the network(s), network link 1121, and communication interface 1120. In the Internet example, server 1126 might transmit a requested code for an application program through Internet 625, ISP 1124, local network 1122 and communication interface 1120.

The computer systems described above are for purposes of example only. An embodiment of the invention may be implemented in any type of computer system or programming or processing environment. When a general-purpose computer system such as the one described executes the process and process flows described herein, it is configured to provide a mechanism for regenerating message data.

Thus, a method and apparatus for regenerating message data has been described. Particular embodiments described herein are illustrative only and should not limit the present invention thereby. The claims and their full scope of equivalents define the invention.